

**Remarks**

The drawings are objected to. Claims 1-18 are rejected under  
35 U.S.C. 103(a) as being unpatentable over Kim et al. (WO  
5 9937486) in view of Lee et al. (US 6,460,961).

1. Objection to the drawings:

The drawings are objected to because on page 4, paragraph  
0030, both the nozzles and the orifice layer are both referred  
10 to using reference 120 and on page 5, paragraph 0031, the  
completed droplet and tail of droplet are both referred  
to by reference 146.

The drawings are objected to as failing to comply with  
37 CFR 1.84(p)(5) because they do not include the following  
15 reference sign(s) mentioned in the description: 334d.

The drawings are objected to as failing to comply with  
37 CFR 1.84(p)(5) because they include the following  
reference sign(s) not mentioned in the description: 21-25,  
130, 148, 520, 916, and 934. A proposed drawing correction  
20 or corrected drawings are required in reply to the Office  
action to avoid abandonment of the application. The  
objection to the drawings will not be held in abeyance.

**Response:**

25 The drawings and the relevant paragraphs of the  
specification have been amended to overcome this  
objection.

Paragraphs 0030 and 0031 of the specification  
30 have been amended to refer to the nozzles with  
reference number 130 instead of number 120. This  
change is supported by Fig.2 and Fig.4, in which

the nozzles are indicated with reference number 130. Also, paragraph 0031 has been amended to use reference number 148 to designate the tail 148 of the droplet 146. This change is supported by Fig. 6.

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Paragraph 0035 of the specification has been amended to correct a mistake in which bubble generator 334c was accidentally referred to as "bubble generator 334d". This change is supported by Fig. 10 and the rest of paragraph 0035.

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Fig. 1 has been amended to remove the reference numbers 21-25. Reference number 130 is located in the currently amended paragraph 0030 and the original paragraph 0031, and therefore has not been removed from the drawings. Reference number 148 has now been added into paragraph 0035, and therefore will remain in Fig. 6. Fig. 13 has been amended to remove the reference number 520. Fig. 19 has been amended to remove the reference number 934. Fig. 20 has been amended to remove the reference numbers 916 and 934.

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Since Figs. 1, 13, 19, and 20 have all been amended, a clean copy and a marked copy showing the changes made is provided for each of these figures. No new matter has been added through any of these changes. Acceptance of the drawings is hereby requested.

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30 2. Rejection of claims 1-18 under 35 U.S.C. 103(a):

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (WO 9937486) in view of Lee

et al. (US 6,460,961) for reasons of record, as recited on pages 2-8 of the above-indicated Office action (part of paper no.3).

5     **Response:**

          Claims 1 and 16 have now been amended to overcome this rejection. Claim 1 now contains the limitation of "three distinct bubble generators electrically connected to a driving circuit". Claim 16 now contains the limitation of  
10     "the first bubble generator group or the second bubble generator group comprises at least two independently drivable bubble generators for generating the first bubble or the second bubble, and the other of the first bubble generator group or the second bubble generator group  
15     comprises at least one distinct bubble generator."

          The currently amended claims 1 and 16 both now state that there are at least three bubble generators in the claimed jet. At least two bubble generators are disposed on a first  
20     side or a second side of the orifice, and at least one bubble generator is disposed on the other side.

          One distinguishing feature of the present invention is that all three of these bubble generators are distinct bubble  
25     generators. That is, none of these three bubble generators are different sections of a same bubble generator--each bubble generators is its own distinct unit.

          On the other hand, in Figs. 2A-2D, Kim et al. teaches  
30     only two bubble generators 20 and 22, with only one on each side of the orifice. Thus, neither a first side nor a second side of the orifice contains two bubble generators.

Lee et al. teaches in Figs.2-3 that a first bubble generator 120 and a second bubble generator 150 are used to form first and second bubbles. Although Figs.6A-6C show bubble generators 120 and 150 on a first side of an orifice 50 and bubble generators 120 and 150 on a second side of the orifice 50, in actuality, only two distinct bubble generators 120 and 150 are used.

The fact that the bubble generators 120 and 150 are circular teaches away from the limitations contained in the currently amended claims 1 and 16. That is, Lee et al. only teaches two distinct bubble generators instead of the three distinct bubble generators specified in claims 1 and 16. Since there are only two distinct bubble generators 120 and 150, the corresponding bubble generators on the first and second sides of the orifice cannot be independently controlled. Therefore, Lee et al. does not teach three distinct bubble generators.

In addition, the limitation of claim 16 that "the first bubble is used as a virtual valve to restrict fluid to avoid flowing to the manifold" has been moved to new dependant claim 23. No new matter is entered.

Neither Kim et al. nor Lee et al. teach a jet having three distinct bubble generators, with at least two bubble generators on the first or second side of the orifice and at least one bubble generator on the other side of the orifice. Therefore, the present invention according to currently amended claims 1 and 16 is not unpatentable over Kim et al. in view of Lee et al. Since claims 2-15 are dependant

on claim 1, claims 2-15 should be allowed if claim 1 is allowed. Likewise, since claims 17-18 are dependent on claim 16, claims 17-18 should be allowed if claim 16 is allowed. Reconsideration of claims 1-18 is hereby requested.

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3. Introduction to new claims 19-33:

Claims 19 and 20 specify the relative magnitude of resistance values in bubble generators on either side of the orifice. The limitations in both of these claims are supported in paragraph 0034 of the specification and in Fig. 9. Specifically, four bubble generators 234a, 234b, 234c, and 234d are shown in Fig. 9. Each has a different width, and therefore a different resistance value.

Claims 21 and 22 are duplicates of claims 19 and 20, and depend on claim 16 instead of claim 1. Acceptance of new claims 19-22 is hereby requested.

Claim 23 includes limitations originally in claim 16, which have been cancelled from claim 16. Claim 24 includes limitations found in claim 4 and is fully supported by the disclosure. Claims 25-33 include limitations found in claims 7-15 respectively and are fully supported by the disclosure. No new matter is entered. Consideration of the new claims 23-33 is hereby requested.

Sincerely yours,

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